INCIDENTAL ENTRAPMENTS IN INSHORE FISHING GEAR DURING 1988: A PRELIMINARY REPORT TO THE NEWFOUNDLAND AND LABRADOR DEPARTMENT OF FISHERIES AND FISHERIES AND OCEANS CANADA - NEWFOUNDLAND REGION.

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15 December 1988

EXECUTIVE SUMMARY

Assistance was provided to inshore fishermen who incidentally caught large whales and sharks so that the animals could be removed quickly and gear damage minimized. Over 800 phone calls reporting entrapments, collisions, or strandings were received during 1988; crews worked a total of 76 days in the field.

For the first time, field crews consisted of fishermen who were trained in entrapment release procedures. This was highly successful and an improvement over volunteer field crews used in past years.

Humpbacks (N = 66) were reported entrapped in codtraps and groundfish gillnets in record numbers. Mortality of the animals caught was higher this year (18%) due to a late start of the entrapment assistance program, weather and other factors. Other whales, including minkes, dolphin and porpoise species were also reported entrapped. There were far fewer basking sharks reported taken this year, perhaps due to a collapse of markets for liver.

We estimate that during 1988 there were about 690 collisions which cost fishermen around $209,000. in gear losses. There appears to be an irregular trend of increased damages each year since 1981 but the amount of damage has not risen to that experienced during the period 1979-1980 when capelin stocks were low and whale abundance inshore was very high. Reasons behind the increase may include inshore fishery effort, whale redistribution and increases in the humpback whale population.

Other animals such as seals and marine turtles were also reported entrapped. A major by-catch of harp seals occurred on the west coast of Newfoundland and was estimated to be over 10,000 animals.

Strandings (N = 22) and ice-entrapments (N = 3) of cetaceans were also reported during 1988. Three blue whales were killed in ice in March.

It is recommended that: (1) entrapment assistance for fishermen continue; (2) a model of humpback populations in waters off Newfoundland and Labrador be developed to understand this population and predict problems which will be experienced with this animal in future years; (3) management responses to the collision problem escalate to include gear modification experiments and systematic consultation with fishermen; (4) serious efforts should be made to re-establish a market for shark livers; (5) a program to carefully monitor by-catch especially seal and harbour porpoise by-catch be established; (6) ice-entrapments of blue whales be carefully monitored and their impact on this population evaluated.

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ACKNOWLEDGEMENTS

We would like to thank the individuals that participated in the review of the entrapment assistance program, which occurred during spring 1988, including representatives of the Minister's Committee on Whales and Whaling, Fisheries and Oceans, Newfoundland and Labrador Department of Fisheries, the Newfoundland Fishermens' Union and the Natural History Society of Newfoundland and Labrador. These agencies and other individuals gave us much helpful criticism, encouragement and advice.

During field work this summer we received assistance from Roy Hart, Frances Barry, Jennifer Atkinson, Sarah Marie Lope, Jim Snook, Dave Snow, Nathanial Ostrum, Neil Bose, Peggy Harrigan, Thea Hines, Harris Vaters and others. The Newfoundland and Labrador Department of Fisheries and the Department of Fisheries and Oceans provided funds to carry out the program. We would especially like to acknowledge the contribution that inshore fishermen have made to the program. Without their cooperation, support and help the program would certainly fail. They deserve full credit for any success it has achieved.

INTRODUCTION

Since 1978 Memorial University, in cooperation with the Department of Fisheries and Oceans and the Newfoundland/Labrador Department of Fisheries, has offered assistance to inshore fishermen in Newfoundland and Labrador who incidentally entrapped large whales and sharks in their fishing gear. Each summer, substantial numbers of the animals are caught and present a difficult problem for fishermen who must remove them quickly with a minimum of gear damage. The entrapment assistance program helps fishermen with this task and has been able to substantially reduce mortality in large whales and minimize gear and down-time losses to the fishermen (Lien 1988).

The entrapment assistance program operated again during 1988 with support from Fisheries and Oceans, the Newfoundland/Labrador Department of Fisheries and Memorial University of Newfoundland.

METHODS

During 1988 the entrapment assistance program operated using methods similar to those of previous years (Lien et al 1987; Lien 1980).

Entrapment assistance was widely advertised by a variety of publications and advertisements, through Fisheries and Oceans field officers and Department of Fisheries field workers, and through meetings with fishermen. Fishermen could call a 24-hour, toll-free phone service for advice and assistance. If assistance was requested, a trained crew was dispatched to help remove the entrapped animal as quickly as possible (Lien et al 1987).

This year, for the first time, the entrapment assistance crew consisted of fishermen who were hired and then trained during the first half of the summer in release methodology. During previous years the entrapment assistance crew had relied on volunteer workers.

Calls were received which reported a variety of problems in addition to the entrapment of large whales and sharks, including strandings and ice entrapments of cetaceans, and entrapment of marine turtles and seals. As appropriate, fishermen were given information, access to tools or field assistance.

RESULTS

During 1988, a total of 846 phone calls were received requesting information or assistance. Crews spent a total of 76 days working in the field.

Humpbacks: Humpbacks have typically been the major problem species for inshore fishermen. A list of humpbacks entrapped in

fishing gear during 1988 is presented in Table 1 and locations of these accidents are shown in Figure 1.

A total of 66 humpback entrapments were recorded. As a result of entrapment, 18% of the animals died; 4 of unknown sex, 5 males and 3 females. Six of the recorded entrapments were not reported by fishermen but were discovered by on-site visits by our crews. Thus it would appear that under-reporting of humpback entrapments in 1988 may be approximately 10%. Most entrapments occurred in July (75%) but substantial numbers also were reported in June (14%) and May (6%). Codtraps (53%) were most commonly involved in entrapments as were groundfish gillnets (33%) but salmon gillnets (8%) also, on occasion, caught whales.

Minke Whales: A total of 9 minke whales were reported caught in a wide variety of fishing gear during 1988 including gillnets for lump, salmon and groundfish, codtraps and crab pots (Table 2). Most minkes died as a result of entrapment (77%). Minke by-catch occurs primarily in June (33%) and July (44%). Number of minke whales reported entrapped in fishing gear between 1979-1988 has been nearly constant each season (Figure 2).

Other Cetacean Entrapments: Twelve other cetaceans of four species were also reported (Table 3) including harbour porpoise, white-beaked dolphins, potheads and a beluga.

Often, entrapments resulted in animals self-releasing before human assistance was given to free it and retrieve the gear. There were four large cetacean entrapments in this category (Table 4).

Strandings and Ice-entrapments of Cetaceans: The entrapment assistance phone service has come to serve as the means for reporting strandings or ice-entrapments of cetaceans throughout the province. During 1988, 22 stranding events (Table 5) and 3 ice-entrapments (Table 6) were reported.

Six of these reports involved very old dead whales. These were referred to the provincial Department of the Environment for disposal. As many as six reports were received about the same large animal (eg. 15 March blue whale). Most reports involved blue whales, but a single right and two minke whales were reported, as were white-beaked dolphins and harbour porpoise. Commonly, because of the state of decomposition, or the fact that we were unable to examine the animal, species identification of animal reported stranded was not determined and is unknown. No effort was typically made to identify animals reported floating at sea by the Canadian Coast Guard.

Ice-entrapments of blue whales occurred in St. George's Bay in March of 1988. Two animals were initially observed trapped behind pack ice but with adequate open water. Several days later, the animals were much more confined by ice and entrapped alive, however, a severe storm prevented direct examination.

Three dead blue whales were later discovered. It is likely that the third animal, although not observed alive, was also killed in St. George's Bay with the other two. The record of blue whales that are known to have been ice-entrapped since 1979 (N = 18) is presented in Table 7.

Ice-entrapments of six white-beaked dolphins and a single minke whale were reported in Trinity Bay in April (Table 6).

Sharks: Only 9 basking sharks were reported entrapped in inshore fishing gear during 1988 (Table 8). These entrapments occurred in salmon and groundfish gillnets as well as codtraps. There was no market for liver during 1988; an unadvertised market for fins was available, but largely unused. Blue and porbeagle sharks were also occasionally reported as by-catch, although markets did not exist for these species during 1988.

Marine Turtles: There were three sightings of leatherback turtles reported during 1988 (Table 9). One of these was an animal incidentally captured and killed in longlines.

Seals: Reports of incidental captures of seals, primarily in gillnets in May and June, were frequently received from the west coast of Newfoundland. These calls are referred to the Sea Mammals Group, Science Branch, Dept. of Fisheries and Oceans. A very substantial by-catch occurred during 1988.

Damages to Fishing Gear: From 1979-1985 the cost of damages to fishing gear caused by large whales and sharks was monitored directly through a damage report card system. Fishermen voluntarily filled in reports when they experienced gear damage. As submission of such information does not result in any direct benefit to the informant, there is a tendency to under-report damages. However, some fishermen who do report may do so expecting some compensation or assistance which would tend to result in exaggerated reports. Because of these difficulties and the effort involved in maintaining the card reporting system, beginning in 1985, cost of damages to inshore fishing gear was estimated (Lien et al 1986).

The ratio of humpback entrapments to the frequency of reported collisions averaged 9.3 from 1979-1985. An average cost of a collision was estimated to be around $300. (Lien et al 1986).

Using this formula, a total of 697 whale and shark collisions are estimated for 1988 costing $209,100. in gear damages. Figure 3 presents costs of gear damages due to whales and sharks each year between 1979-1988.

DISCUSSION

Entrapments of Humpbacks: Humpback entrapments in fishing gear were at record levels during 1988. The number of humpbacks

entrapped during 1988, based on a 10% under reporting estimate, would likely be about 72 animals. Known mortality of humpbacks was 18%; 12 animals are known to have died as a result of gear entrapment. This is a substantial increase in mortality over that recorded in the recent past (Lien 1988).

Early mortality of humpbacks in fishing gear occurred because there was no entrapment assistance program. Due to financial constraints, we were unable to answer assistance calls from fishermen until June. The record of one animal shot and wounded, another towing gear off and three dead humpbacks is a discouraging indication of results of entrapments when assistance to fishermen is not available. Prior to the entrapment assistance program which was first developed in 1979, mortality as a result of entrapment was estimated at about 50% (Lien 1980). After 1979-1980 mortality of humpbacks has been low (Lien 1988).

In addition to arguing for the necessity of the entrapment assistance program, early 1988 results indicate serious limitations in efforts to have fishermen release humpbacks on their own, with only advisory assistance. Although there are many fishermen who do this, it is difficult and may be dangerous. Fishermen who perceive the whales as pests, may not be willing to learn new methods.

Absence of early season entrapment assistance alone cannot account for all the increase in mortality. In July, dead whales were discovered in fishing gear which had not been hauled in some time because of bad weather or the fishermen's involvement in the capelin fishery. Weather was bad during the summer of 1988 and many fishermen abandoned cod gear for a period to concentrate on the capelin fishery; both resulted in unattended gear. The length of time an animal stays entrapped in fishing gear appears directly related to mortality (Lien et al 1985).

For the first time in several years, a substantial number of humpback entrapments were discovered that were not reported to us by one means or another (N = 6). It is possible that fishermen, because of the level of damages they receive from whales, the absence of economic assistance in the form of markets for large sharks, or other reasons are less willing to cooperate with the entrapment assistance program now than in previous years. Should this be true and continue, humpback mortality as a result of entrapment will certainly increase.

Number of humpback entrapments (Figure 2) and the amount of gear damage (Figure 3) has been increasing. There could be several reasons for this.

One, of course, is the willingness of fishermen to voluntarily report entrapments and damages. Over the years, cooperation with the program has been very good and our estimates of under-reporting of entrapments have been consistently low. About 10% of humpback entrapments were not reported by fishermen

this year however.

A second possibility is that fishing effort has been increasing. Effort data on inshore fishing is generally poor, difficult to obtain and, because of differences in yearly conditions which subtly changes the actual efficiency of effort, is difficult to interpret. While fishing effort cannot be discounted as responsible for changes in entrapment reports, it likely is not the only cause of increases.

Data which can be used to argue this case are limited but some indication of increases in damages without an increase in effort is available for the St. Vincent's/St. Steven's/Peter's River area which has been closely monitored for a decade. Damages to codtraps there have been recorded by in situ crews (1979-1984) and interviews with fishermen (1985-1988). In 1980, there were a total of 55 collisions with codtraps. In the early 1980's collisions fell to only several per year as humpback abundance inshore decreased with a reversal in capelin stocks (Lien and Whitehead 1983). Between 1982-1987 collisions increased from 4-15 per year. In 1988, 21 collisions were identified.

Such data tends to support the conclusion that damages to gear caused by large whales are increasing. However, because of variations by year, interactions between fishing effort and whale abundance and the fishermans' willingness to report or complain about gear damage, it is difficult to be sure that the apparent increase in damages throughout the province as a whole is in fact a real one.

The third possibility accounting for increases in damages may be increases in numbers of humpbacks inshore. Numbers of minkes entrapped each year has been more or less constant over a decade (Figure 2). Basking shark by-catch varies widely between years (Figure 3) and is an interactive function of water temperatures, subsequent shark abundance and in shore fishing effort (Lien and Fawcett 1986). Humpbacks are the large animal that have probably accounted for the irregular trends in fishing gear damage.

Changes in the number of humpbacks inshore could be due to redistributions such as occurred during 1977-1980 (Whitehead and Carscadden 1985). During that period, the immature biomass of capelin was low offshore and substantial numbers of humpbacks appeared in inshore waters feeding on mature spawning capelin. As the offshore biomass increased, fewer humpbacks exploited inshore waters. This year, immature capelin biomass was high offshore and spawning capelin inshore were believed to be plentiful, although analysis of these data are at present incomplete (J. Carscadden, D.F.O., Personal communication). It may be that given a "choice" between ample biomass of spawning vs immature capelin, humpbacks select spawning fish which, per unit, have greater caloric worth.

Increases in the population of humpback whales could also account for increased gear damages. The more humpbacks the higher the number of accidents.

Whitehead (1982) estimated a Newfoundland/Labrador humpback population of 1,535-2,720 based on mark-recapture photography. Katona et al (1983) estimated a NW Atlantic population of between 6,777-10,464 based on photographic mark-recaptures. The Newfoundland/Labrador stock is typically estimated at over 50% of this population which would give a rough estimate of between 3,388-5,232 between 1980-1982. Whitehead (1987) in his COSEWIC status report on humpbacks cites his conservative 1982 estimates. He points out difficulties in demonstrating a growth in the NW Atlantic population due to quality of data and difficulty in comparing estimates based on different methods. Given those problems and the demonstration of yearly distributional differences (Whitehead and Carscadden 1985), an increase in Newfoundland/Labrador humpback numbers, sufficient to account for increases in entrapments and damage, is not proven. It is likely partially responsible however and must be investigated to anticipate problems which may occur in future years.

H. Gaskill (Math.,M.U.N.) and S. Katona (College of the Atlantic, Bar Harbour Maine), who maintains the humpback fluke catalogue (Katona et al 1980), have indicated they will help develop a model of the Newfoundland/Labrador humpback population. Work on this will be completed during the coming year. The goal is to understand the present population, predict future developments and what effects this may have on the Newfoundland/Labrador inshore fishery.

Amount of Damage: Damages over the past decade are shown in Figure 3. High damage levels during the period of 1978-1980 were largely due to a redistribution of humpbacks to inshore waters resulting from low immature capelin biomass offshore (Whitehead and Carscadden 1985). In the early 1980's, damages to fishing gear were low but have been irregularly rising. The increases found in the St. Vincent's area parallel this general trend. Whatever their cause, the increased damages have a real impact on fishermen's attitudes. Basking shark markets, which in some past years replaced a substantial proportion of financial losses resulting from gear collision, have disappeared and this may also effect fishermens' attitudes. For the first time, a substantial number of unreported humpback entrapments have been detected and mortality as a result of collisions have increased.

During 1989, in cooperation with the Canadian Wildlife Service and the Sea Mammals Group in Science Branch, Fisheries and Oceans, we will try to establish a systematic, long-term monitoring program for by-catch. While data resulting from the voluntary reports of fishermen requesting services is useful, it presents many difficulties. The new monitoring system will improve our ability to accurately record fishing effort and to detect trends in by-catch of cetaceans and the gear damage they

cause.

We have not conducted systematic interviews with fishermen about the collision problem recently. R. Graham (U. of Waterloo), on sabbatical at M.U.N. during 1989, will begin an interview study of fishermen in the spring of 1989 which will investigate, among other issues, their views on the whale problem.

The management response to the whale and shark collision problem has been the entrapment assistance program which minimizes mortality of large whales and results in substantial savings in gear losses and down-time (Lien 1988). Although this has been the most cost-effective assistance that can be offered to fishermen, it may now be time to escalate efforts to help them. In 1989 we will propose a series of gear modification experiments designed to prevent whale collisions with gillnets and codtraps.

Entrapment Assistance Program: For the first time the entrapment assistance program did not rely on the volunteered time of students and researchers but used a special crew of trained fishermen. Fishermen were a fine success and researchers were released, after a decade of "entrapment", for other activities. This change must be considered the biggest success of the year!

Shark By-Catch: There were very few basking sharks or smaller varieties of sharks reported this year. In the past, we have helped market sharks for fishermen but this year markets did not develop locally. The low number of animals reported as by-catch probably reflects the absence of markets rather than greatly diminished catches. Sales of shark liver have helped fishermen cope with gear damages experienced through incidental catches. Serious efforts should be made early in the year to re-establish these markets. This might be best done by the Newfoundland/Labrador Department of Fisheries.

Ice-Entrapments of Blue Whales: Since 1979 there have been 18 blue whale ice-entrapments on the sw coast of Newfoundland (Table 7). Additional data on blue whale distribution was gained in 1987-1988. Prediction of ice-entrapment events became possible by increased understanding of blue whale distribution and new knowledge of the oceanography of ice movements in the area (Lien, Stenson and Jones 1988). Continued monitoring of these ice-entrapments is necessary. A critical factor in assessing the potential impact of ice-entrapment mortality on the population is the delineation of the stock itself. These studies will begin in the near future using photo-identification techniques (Sears, Wenzel and Williamson 1988) and DNA analysis (P. Jones, Dalhousie University). H. Gaskill (M.U.N.) developed a Gulf of St. Lawrence population model for blue whales intended to evaluate the impact of ice-entrapment but field data is needed before it will be useful.

Harbour Porpoise By-Catch: Although there were less than a dozen small harbour porpoise reported taken incidentally in inshore fishing gear, it is believed that this by-catch is substantial (Lien 1987). Because they cause little damage and are typically used for food, fishermen have little incentive to report by-catches (Lien, Stenson, Ni 1988). A monitoring program which effectively describes the extent of this by-catch should be given a high priority.

Harp Seal By-Catch: Frequent calls about incidental catches of young harp seals were received and, although the data is sketchy, these have increased dramatically over the past several years. In 1988, it was estimated that 10,700 seals were taken primarily in gillnets on the west coast of Newfoundland. There are no estimates for other coastal areas although it is known that incidental catches occur commonly on the south coast (Lien, Stenson, Ni 1988). It is likely that this will emerge as the major by-catch problem in Newfoundland and Labrador in the very near future.

Marine Turtles: There were few leatherback turtles during 1988. We are now much more able to respond when this endangered species is reported. A basic understanding of their distribution has been gained (Goff and Lien 1988); an educational program encouraging fishermen to release them independently has begun; and there is a group of researchers (Goff, M.S.R.L.; Stenson, D.F.O.) now interested in studying this by-catch.

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TABLES

Table 1: Humpback whales reported entrapped in inshore fishing gear during 1988.

Date	Place	Gear Type	Outcome
25 April	Trepassey	Crab pots	Shot, towed off gear
14 May	Cowhead	Gillnets	Partial release, towed gear off
19 May	Dildo, T.B.	Gillnets	Dead Male. Examined by Lien
31 May	Kings Cv., BB	Codtrap	Dead Male, Examined by Lien
31 May	St. Vincents	Gillnets	Dead female, Examined by Lien
19 June	Gaskiers,SMB	Codtrap	Released alive
19 June	Twillingate	Salmon net	Self release
21 June	Twillingate	Salmon net	Self release
21 June	Port de Grave	Caplin Seine	Released alive
22 June	St. Vincents	Codtrap	Released alive
25 June	St. Stephens	Codtrap	Self release
25 June	Bryants Cv.,CB	Caplin trap	Released alive
25 June	Change Is,NDB	Codtrap	Released alive
31 June	Tilting,Fogo I.	Salmon gillnet	Released alive
1 July	Twillingate	Codtrap	Released alive
1 July	Twillingate	Salmon gillnet	Released alive
2 July	Pouch Cove	Codtrap	Dead female, Examined by Lien
4 July	Portugal Cv.S	Codtrap	Released alive
5 July	Small Hbr.,CB	Codtrap	Released alive
6 July	Portugal Cv.S	Codtrap	Self release
7 July	Portugal Cv.S	Codtrap	Released alive
7 July	Williamsport	Codtrap	Dead male. Not Examined
7 July	St. Stephens	Codtrap	Self release
7 July	Peter's River	Codtrap	Dead female, Examined by Lien
7 July	Riverhead,SMB	Codtrap	Released alive
7 July	Portugal Cv.S	Codtrap	Self release
8 July	LaScie, WB	Gillnets	Released alive
9 July	St. Shotts	Gillnets	Self release
9 July	Pacquet,WB	Gillnets	Towed gear off
9 July	Purcells Hbr.	Codtrap	Self release
9 July	Tilting, Fogo	Gillnets	Released alive
11 July	St. Vincents	Codtrap	Self release
11 July	Fleur de Lys	Codtrap	Dead ?, Not examined
12 July	St. Shotts, SS	Gillnets	Released alive
12 July	Renews	Codtrap	Dead male, Examined by Lien
13 July	Champneys East	Salmon gillnet	Self release
13 July	Bay de Verde	Gillnets	Released alive
14 July	Pacquet, WB	Codtrap	Self release
14 July	St. Shotts, SS	Gillnets	Released alive
15 July	Flowers Cv.	Codtrap	Dead ?, Not examined

16 July	St. Shotts, SS	Gillnets	Released alive
18 July	Cotterels, Cv.	Gillnets	Dead male, Not examined
19 July	Riverhead,SMB	Codtrap	Released alive
19 July	Eddies Cv. E	?	Floating dead?, Evidence of gear entrapment, Not examined
19 July	Griquet	Codtrap	Self release
20 July	Battle Hbr.	Codtrap	Self release
20 July	Fleur de Lys	Codtrap	Dead ?, Not examined
20 July	Battle Hbr.	Codtrap	Released alive
20 July	Battle Hbr.	Gillnets	Towed gear off
20 July	Musgrave Hbr.	Gillnets	Released alive
20 July	Battle Hbr.	Gillnets	Towed gear off
20 July	Valleyfield	Gillnets	Released alive
21 July	Morton's Hbr.	Codtrap	Self release
21 July	Brigus S.	Codtrap	Self release
21 July	Wesleyville	Gillnets	Released alive
22 July	Englee	Codtrap	Released alive
22 July	Englee	Codtrap	Self release
23 July	Jacksons Arm	Codtrap	Self release
24 July	Shoe Cv.,NDB	Gillnets	Towed gear off
25 July	St. Anthony	Gillnets	Towed gear off
26 July	Jackson's Arm	Gillnets	Towed gear off
27 July	Bay de Verde	Codtrap	Released alive
30 July	Conche	Codtrap	Released alive
31 July	Conche	Gillnets	Towed gear off
1 August	Henley Hbr.	Codtrap	Released alive
28 August	Durrell,NWI	Gillnets	Released alive

Table 2: Minke whale entrapments in inshore fishing gear reported during 1988.

Date	Place	Gear	Outcome
18 March	Sheaves Cv.	?	Dead animal, rotten when examined. Reported caught in gear last year.
20 June	Gaskiers, SMB	Codtrap	Released alive
20 June	Gaskiers, SMB	Gillnets	Dead ?, Not examined
20 June	Renews, SS	Codtrap	Dead ?, Not examined
20 July	Battle Hbr.	Salmon net	Dead ?, Not examined
20 July	Kelly's Is,CB	Lumpnets	Released alive
20 July	Pools Is.,BB	Salmon net	Dead ?, Not examined
20 July	Battle Hbr.	Salmon net	Dead ?, Not examined
13 Oct.	Valleyfield	Crab pots	Dead ?, Not examined

Table 3: Other cetacean species reported entrapped in inshore fishing gear during 1988.

Date	Place	Species	Outcome
30 March	Holyrood,CB	Wt.-beaked dolphin	Dead. Caught in herring net. Previously entrapped
24 May	St. Brides, SMB	Hbr. porpoise	4 animals caught in spring fishery
25 June	Bauline,CB	Wt.-beaked dolphin	2 animals dead in codtrap
10 July	Aquaforte,SS	Hbr. porpoise	2 animals dead in codtrap
9 August	St. Jullians	Beluga	Dead ?, Not examined
26 August	Spanards Bay	Pothead	Released alive
5 Sept.	Spanards Bay	Pothead	Released alive from gillnet

Table 4: Unknown large species of cetaceans reported entrapped in inshore fishing gear during 1988.

Date	Place	Gear	Comments
25 June	Gaskiers,SMB	Codtrap	Self release
31 June	St. Vincents	Codtrap	Self release
31 June	St. Vincents	Codtrap	Self release
24 July	Battle Hbr.	Codtrap	Self release

Table 5: Cetacean strandings reported during 1988.

Date	Location	Species	Comments
29 Feb.	Port aux Basque	Blue	Dead animal from 1985 ice entrapment
5 March	NW Cove (near Port aux Basque	Blue	Dead animal from 1985 ice entrapment
15 March	Black Duck	Right	Very rotten, Examined by Lien, est. 13 m.
15 March	Stevenville	Blue	Dead male, Not examined
17 March	Cape Anquille	Blue	Same as above
18 March	Highlands	Blue	Drifting in ice, same as above
21 March	Highlands	Blue	Same as above
31 March	St. Shotts,SS	Wt-beaked	Beached live, killed, Examined by Lien, dead male
31 March	Shearston	Blue	Dead male, Same as animal first seen in Stevenville, 15 March, Examined by Lien
29 April	Red Hbr., P.B.	?	On offshore islands, Not examined
24 May	Port aux Basque	Blue	Dead ?, Not examined, Different than Shearston whale
26 May	Bay St. George	Blue	Dead female, Not examined
9 June	Port aux Choix	?	Dead stranded; later floating dead whale rept. from Coast Guard
21 June	Capphaden, SS	?	Live stranding by several of unknown species; left alive on high tide
21 June	Flatrock	Hbr.Porp.	Young female stranded live; later died
24 June	Cape St. George	Minke	Dead female, Examined by D.O.E.
10 July	St. Brides	?	Dead whale drifting with gear on it, Not examined
22 July	Eddies Cv.	Blue	Dead ?, Examined by D.F.O.
10 August	Pt. May	?	Dolphin spp. live stranded, killed, Not examined
22 July	Labrador Ferry	Minke	Decomposed, floating, Not examined
29 August	Fluer des Lys	?	Decomposed unknown spp.
15 Nov.	Port aux Choix	Blue	Very old, decomposed, Not examined

Table 6: Ice entrapments reported during 1988.

Date	Location	Details
10 March	Bay St. George	Live entrapment of 2 blues; 1 finally stranded dead at Stevenville on 15 March; 2nd at Port aux Basque on 24 May; 3rd animal also killed.
11 April	Hant's Hbr.,TB	6 White-beaked dolphins dead; Not examined due to ice conditions
12 April	Little Catalina	Minke whale in ice. Disappeared

Table 7: Ice-entrapments of blue whales (1979-1988).

Year	Description of ice entrapment
1979	None
1980	Three animals alive in ice off Port aux Basque 12 March; 4th also alive but not confirmed as a blue; all dissappeared.
1981	None
1982	One alive off Port aux Basque 9 March; 12 March 2 M dead Red Rock Point and Stevenville; 20 April dead M at Burgeo.
1983	None
1984	None
1985	One dead F Port au Port, 6 May.
1986	One M 13 March Penguin Is.;4 dead Grand Bay W. on 20 April; 1 alive 24 April at Isle aux Mort.
1987	None
1988	10 March live entrapment of 3 in St. Georges Bay; Killed by ice on 15 March.

Table 8: Basking sharks incidentally caught in inshore fishing gear and reported during 1988.

Date	Location	Gear
21 June	Twillingate, NWI	Salmon net
4 July	Harbour Breton,FB	Codtrap
10 July	St. Brides	Gillnets
15 July	Ladle Cove, NDB	Salmon net
18 July	Harbour Breton,FB	?
2 August	Frenchmens Cv.,FB	Gillnets
3 August	Harbour Round,NDB	Gillnets
9 August	Renews, SS	Codtrap, Examined by Lien
9 August	Argentia, PB	Codtrap, Examined by Lien

Table 9: Leatherback turtles reported inshore during 1988.

Date	Location	Details
7 Sept.	Fermuse, SS	Turtle observed swimming
8 Sept.	Chance Cove Head,SS	Turtle observed swimming
14 Sept.	Cape St. George	Female Leatherback turtle dead in longlines. Examined D.F.O.

FIGURES

Figure 1: Locations of humpback whale entrapments during 1988. Total N = 66.

Figure 2: Numbers of humpback and minke whale entrapments from 1979-1988.

Figure 3: Frequency of collisions by large whales and sharks and cost of damages to inshore fishing gear (1979-1988). (1) Actual number was 813. (2) 208 of this number were basking shark collisions on the sw coast. fishing gear

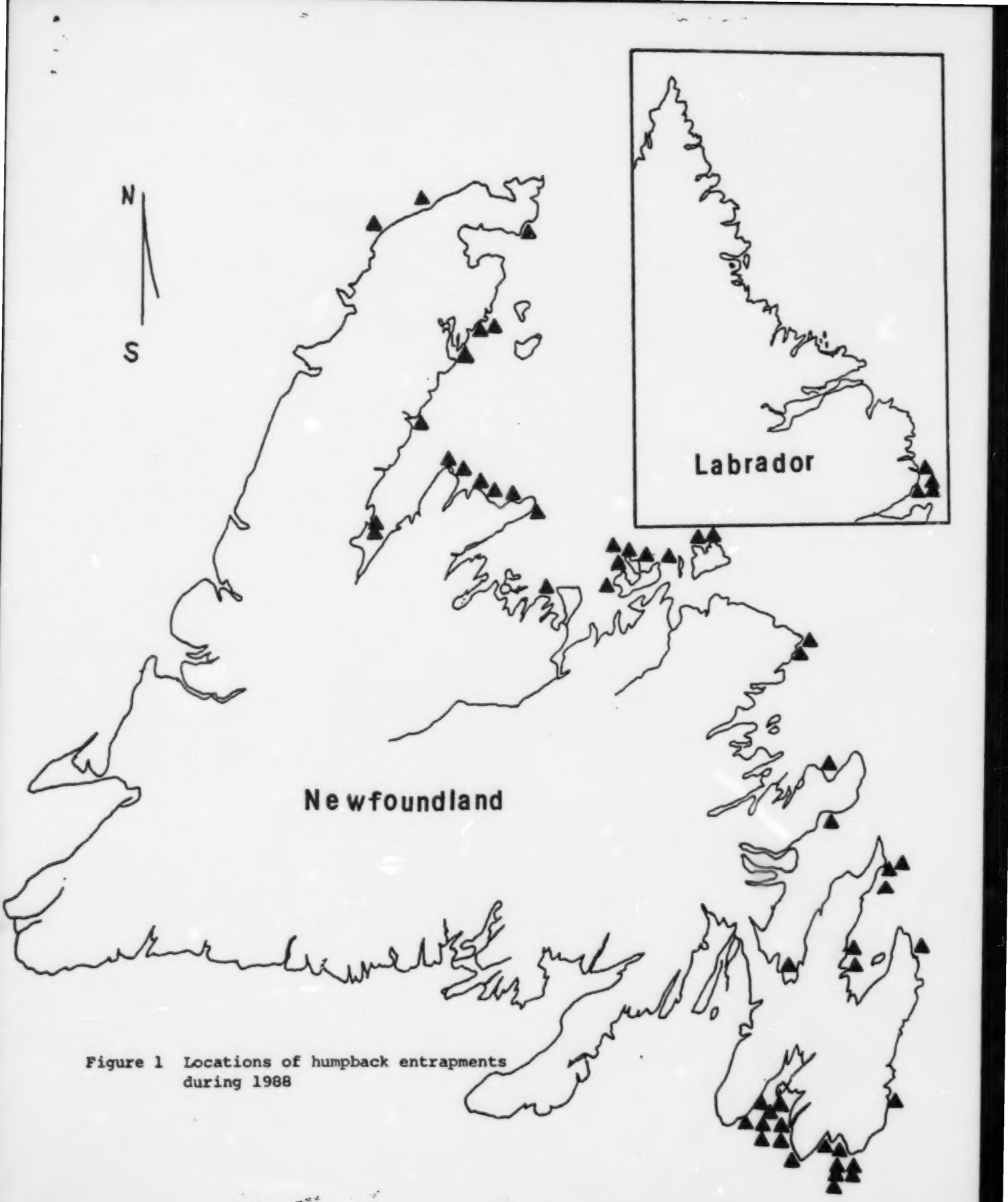

Figure 1 Locations of humpback entrapments during 1988

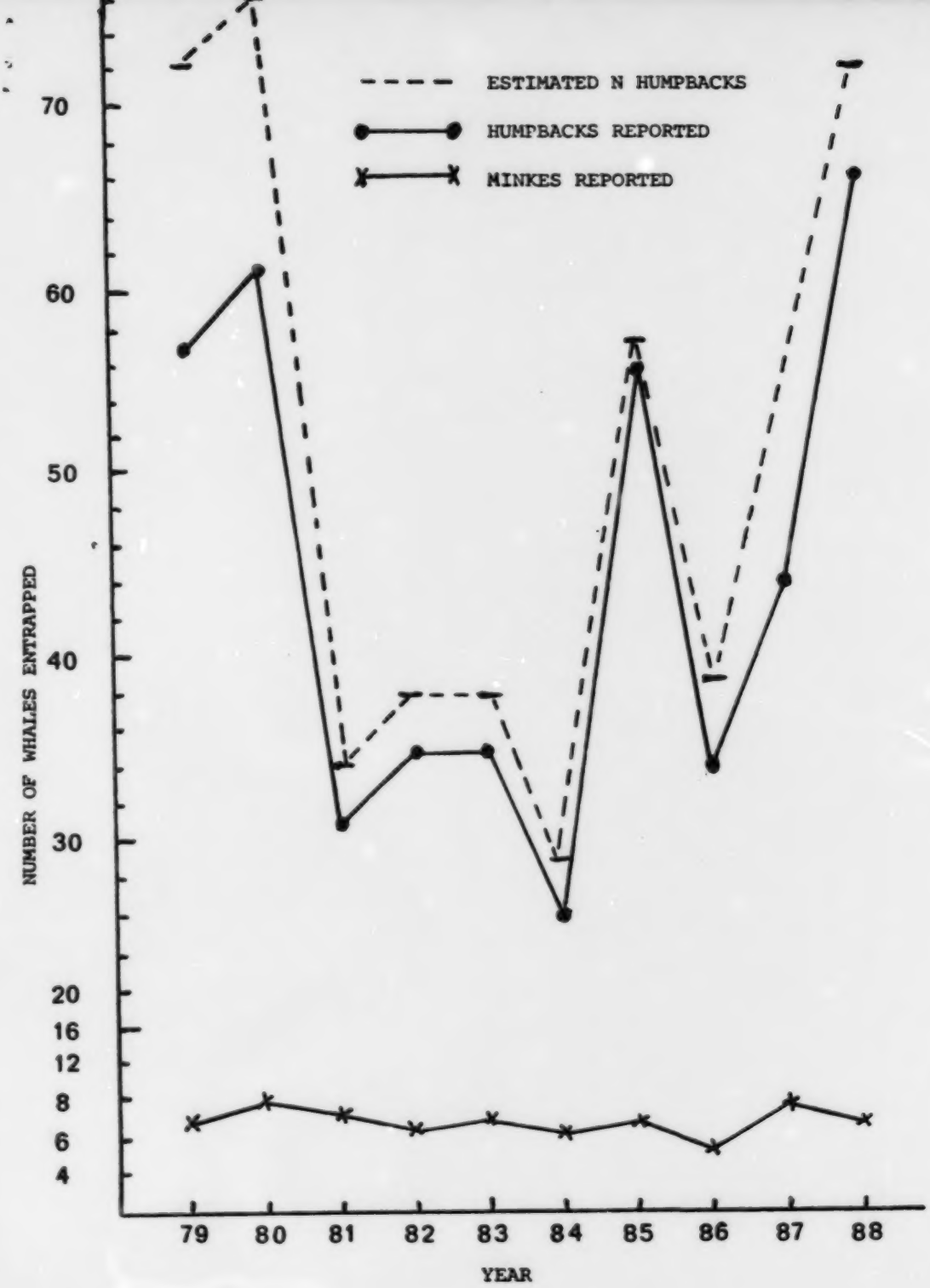

Figure 2 Numbers of humpback and minke whale entrapments from 1979-1988.

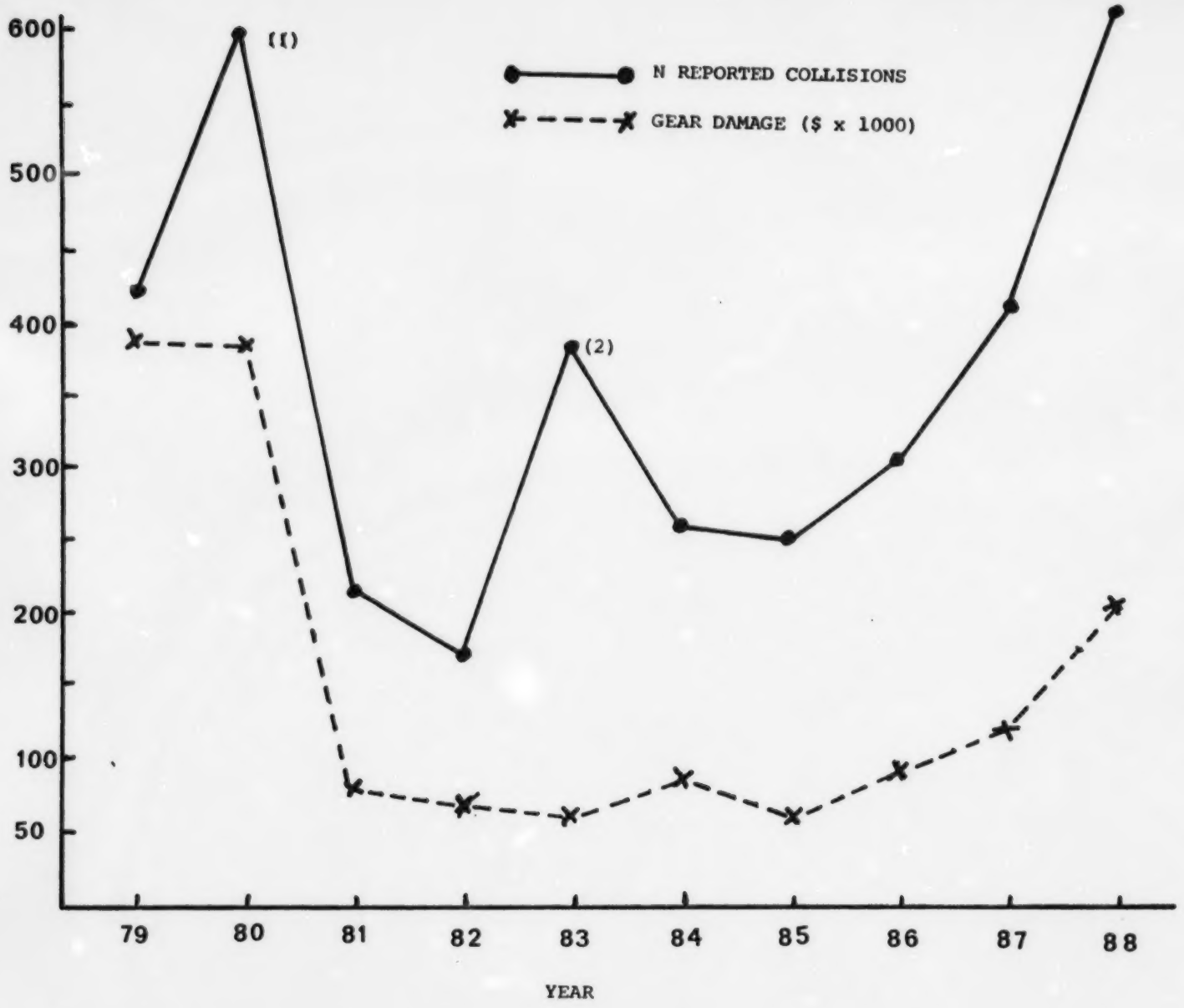

Figure 3 Damages to inshore fishing gear due to collisions by whales and sharks (1979-1988). (1) Actual number was 813 (2) 208 of this number were basking whark collisions.